

**SYSTEM AND METHODS FOR OBTAINING ADVANTAGES AND  
TRANSACTIONING THE SAME**

**5    Priority**

This application is related to and claims priority under 35 U.S.C. § 119(e) to U.S. Provisional Patent Application Serial No. 60/212,749, filed June 20, 2000, entitled "SYSTEM AND METHODS FOR OBTAINING ADVANTAGES AND TRANSACTIONING THE SAME", the contents of which are hereby incorporated by reference in their entirety.

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**Field of the Invention**

The present invention relates generally to the creation, integration, and transaction of advantages. Particularly, the present invention relates to the creation, integration, and transaction of advantages in non-computing, partial-computing, and computing environments, and more particularly, to providing a system and methods for the creation, integration, and transaction of advantages in non-computing, partial-computing, and computing environments that provide participating users the ability to obtain advantages at will.

**Background of the Invention**

Today, we face many challenges in our daily lives that demand the expenditure of valuable resources. These challenges can be more easily disposed with the aid of advantages. Generally, an advantage is a feature or element within an environment that one is not intended to have or does not normally have access to that provides an edge in overcoming a presented challenge. In the context of an observed environment, these advantages are environment features or elements that help to better navigate and exist within the observed environment.

Advantages are conventionally realized through rigorous physical and/or mental training, by employing advanced instruments, or, for the non-scrupulous, through bribery, cheating, and deception. The latter category has allowed for some significant events in our society today. For example, some ventures, and even some governments can base their existence on the capitalization of advantages. Subscribing to social conventions, the use of

these advantages is traditionally kept secret in fear of retaliation, reprimand, and rebuke from non-sanctioning parties. Considering the benefits that may be realized from the use of advantages, if given the choice, most would employ advantages in their environments to assist them with their daily challenges.

5 Human nature dictates our need to achieve. This is apparent in the field of gaming. Gaming enthusiasts are willing to pay for the opportunity to obtain an advantage. This is especially the case where the player has spent a significant amount of time and energy in overcoming various challenges within the game to reach the desired goal of completing the game, but is unable to overcome a particular posed challenge. In such a circumstance, the  
10 player will likely be willing to pay for the ability to obtain an advantage or advantages to overcome this posed challenge. In recent years, gaming enthusiasts have enjoyed a number of action, action-adventure, adventure, and strategy games, such as, DOOM®, QUAKE®, AGE OF EMPIRES®, ULITMA ONLINE®, etc. The object of these games is to wage battle with various beings in an effort to win a war or improve your standing within the game and/or gaming community. These games are typically structured such that the player is given  
15 access to increasingly superior weaponry and/or skills as they advance through increasingly difficult game levels. It would be advantageous to gamers to have access to these superior weapons, or alternatively, additional ammunition for their existing weaponry, and/or superior skills earlier in the gaming experience.

20 The concept of obtaining advantages may be extended beyond the gaming context. For example, consumers may be willing to pay to obtain advantages, such as, procuring a more preferred seat on an airplane, train, or bus; or obtain additional golf strokes during a golf match. Further, the concept of obtaining advantages includes obtaining unfair advantages. An unfair advantage is generally a legally recognized advantage that confers an  
25 inequitable benefit to the requesting party (e.g. a person pays an additional "special" tax to a municipality and in turn receives a prime parking spot in the heart of the downtown municipality). Today, however, there are no comprehensive systems and methods for the creation, integration, and transaction of advantages. Interested participants are typically relegated to searching for free shortcuts and tricks (i.e. advantages) in on-line chat rooms and  
30 bulletin boards or to purchase and subscribe to publications. For example, in the gaming

world, gamers may spend as much time and resources obtaining advantages as they do actually playing the games. Few advantages are contemplated, let alone offered to interested participants in non-computing and partial computing environments. Generally, interested participants are left to face obstacles in these environments without the aid of any advantage.

- 5 For example, an interested participant, not afforded the sanctioned ability to speed in a rural community and is caught speeding, may have to pay a hefty fine and/or expend significant time and energy in challenging the speeding offense. As a result, the interested participant expends a great deal of resources to face obstacles that could otherwise be overcome.

10 From the foregoing it can be appreciated that there exists a need for comprehensive systems and methods that allow for the creation, integration, and transaction of advantages in computing, partial computing and non-computing environments. By providing a system and methods that allow for the creation, integration, and transaction of recognized and sanctioned advantages and unfair advantages, challenges may be more easily resolved freeing valuable resources.

15 **Summary of the Invention**

20 The present invention is directed to providing systems and methods used to create, integrate, and transact various advantages in non-computing, partial computing, and interactive computing environments. These advantages comprise desired environment features or elements within a participating user's environment that are integrated within the environment. By integrating advantages, the present invention operates to facilitate the leveraging of advantages to participating users and offers advantage providers ensured exposure of their advantages.

25 In one illustrative implementation, the present invention may be realized through interactive computer applications supporting simulation and/or display. In this capacity, the invention is directed to a system and methods for identifying, creating, integrating, and transacting advantages to users of interactive computing applications. With this implementation, a participating user may obtain, in real time and upon payment of consideration, access to content, products, and/or services that are only offered to those users  
30 who have advanced or extended content, products, or services privileges. These advantages

may be varied in form and content.

In operation, computing environment content providers may offer desired environment features or elements to participating users such that the desired environment features and/or elements are integrated within participating users' computing environments.

- 5 These environment features and elements may be directly or indirectly associated with the scope of features or elements offered by the content providers. Using the present invention, participating users have the ability to "purchase" these environment features or elements using various currency means, including credit cards, e-cash, e-gold, other Internet enabled currency, and secondary monetary sources, such as, charges to phone or utility bill,
- 10 transferring credit on pre-paid phone cards, or transit passes, or through conventional payment methods, such as checks, money-orders or cash. The participating user is allowed to exploit as few or all of the environment features and/or elements that are offered.

- Another aspect of the illustrative implementation includes the ability to provide incentives to participating users such that the price of a desired environment feature and/or
- 15 element becomes incrementally lower with increased purchase of offered environment features and/or elements. In the alternative, additional non-related environment features and/or elements may be offered to participating users with increased use. In an illustrative implementation, the participating user may receive his or her "N+1th" advantage for free with the confirmed purchase of "N" environment features and/or elements, or alternatively, the
- 20 participating user may receive a real-world product, service, or securities with a significant number of environment feature and/or element purchases. Not only can advantage purchases offer increasing returns in terms of more advantages or real world products, but the purchases of real world products and services can offer increasing returns to advantages. For example, a participating user could receive a free advantage in return for purchasing a product or service.
- 25 Participating users might also receive discounted advantages for revealing more information about themselves as a consumer. Conversely, the present invention contemplates offering credits to participating users for contributing already acquired environment features and/or elements.

- Another aspect of the illustrative implementation includes the ability to integrate
- 30 interactive advertisements that offer real world products and services to participating users

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navigating in a computer based environment. Stated differently, interactive advertisements are integrated within a participating user's environment such that a participating user, who is navigating in this cyber realm, may elect to purchase these products and services from the convenience of his/her computing environment without having to interface with other communication conventions. The transaction may be realized through a true two-way real time transaction system, allowing participating users to continue in their experience without the interruption of processing payment information. The computing environment may store a profile of the user so that key products and services may be offered in accordance to a user's profile. Further, the present invention contemplates a system wherein advertisers of products and services may obtain advantages over their competitors to better place their products and/or services to reach a larger audience.

Alternatively, in an illustrative non-computing application of the present invention, organizations or institutions may elect to offer and monetize non-computing environment features and/or elements (e.g. pay for the right to drive above the speed limit) by charging participating users fees for these environment features and/or elements. The implementation features are similar to those described for computer mediated environments where human interaction may replace the computer mediation in whole or in part.

Other features of the present invention are described below.

## **Brief Description of the Drawings**

A system and methods for the creation, integration, and transaction of advantages are further described with reference to the accompanying drawings in which:

Figure 1 is a system diagram of an exemplary computing environment in accordance with the present invention;

Figure 1A is a system diagram of an exemplary computing network environment in accordance with the present invention;

Figure 1B is a system diagram showing the interaction between exemplary computing components in accordance with the present invention;

Figure 2 is a screen shot of an exemplary gaming computing application offering advantages to participating users;

Figure 3 is a screen shot of an exemplary Internet based computing application offering advantages to participating users;

Figure 4 is a screen shot of an exemplary computing simulation application offering interactive advertisements to participating users;

5        Figure 4A is a screen shot of an exemplary computing simulation application showing the real-time transaction in accordance with the present invention;

Figure 5 is flow diagram of the processing performed by present invention to create and transact advantages; and

10        Figure 6 is a block diagram showing the interaction among various parties to realize a real-world implementation of advantages transaction in accordance with the present invention.

### **Detailed Description of Illustrative Implementation**

#### **Overview:**

15        Obtaining advantages is the process of acquiring something that one is not otherwise entitled to have. To date, society has been structured in such a manner to prevent its members from gaining such advantages. This structure has been implemented informally in society as a result of the development of culture, ethics, mores, and religious conventions. However, as time has passed, society has evolved to recognize benefits in providing sanctioned  
20        advantages. However, today the transaction of advantages is performed piecemeal and is very fragmented. A more comprehensive systems and methods would provide a centralized solution for the procurement and transaction of advantages.

Advantages may be offered and transacted for a variety of scenarios occurring in non-computing, partial-computing, and computing environments. Examples may include: online  
25        computer games; online entertainment and information; offline computer games; regular board games; sports; gambling; sales; services and queuing; employment (e.g. promotions, hiring, etc.); issuing permits; and securities and finance. By providing a system and methods for procuring and transaction advantages, participating users may be afforded the ability to efficiently achieve sought after advantages, and participating advantages providers may be  
30        afforded additional revenue streams for offering advantages.

Identifying Advantages:

The types of advantages most likely to interest users are those that help them gain status, power, provide entertainment, or give rights they would not normally be able to obtain. Advantages, however, may comprise a variety of desired environment features and/or elements. Using these exemplary criteria, environment feature and/or elements providers (e.g. a game designer) can better predict advantages (e.g. providing an extra life within a game) that would be desirable to participating users. For example, in the context of a game, ammunition, resources, information about the game environment, and numerous other items can be quantified by the game designer as suitable advantages that can be created, integrated, and transacted. In other contexts, environment feature and/or element providers can offer features and/or elements that assist participating users to overcome frequently presented challenges.

Creating Advantages:

Once identified, the advantage provider's are charged with the task of creating the advantage for transaction. Generally, there are several requirements that are considered when creating advantages. These requirements include the rights of control over the advantage (i.e. who has the authority to edit, modify, and offer the advantage) and the ability to secure the advantage (i.e. is the advantage feasible legally, ethically, and financially and how will the advantage be accessed). In the context of a game environment advantage, the game designer controls the resources of the game thereby having the ability to create and provide advantages to game participants. In this capacity the advantages offered to participating users may give some control over a game's resources (e.g. ammunition, lives, etc) for a price. The advantage provider can decide the nature and extent of such control based on any number of factors such as cost, purchase history, demographic data, etc. The ability to secure the advantage is also extremely important when creating an advantage. For example, in a non-computing environment advantage example, a city may offer its residents the ability to speed throughout the city in return for the payment of a special "city speed" tax. To realize this advantage, however, the city government should have the ability to 1) enforce the speed limit, and 2) be

legally able to authorize driving faster than the speed limit. In this example, the city may show control over the advantage by choosing to limit the availability of the advantage to those drivers whose driving record meets certain requirements.

5 Integrating Advantages:

Once an advantage is identified and created it is integrated within an environment and coupled to a transaction system for transacting. The integration of advantages depends heavily on the environment in which the advantage is to be offered. For example, if the advantage is to be integrated in a computing environment, the identified and created  
10 advantage may be included in the source code of the computing application operating in the environment. Comparatively, if the advantage is to be offered in non-computing environments, the advantage may be integrated within a complimentary product or service that is offered to the participating user. For example, a participating user playing a round of golf may be offered the advantage of having two additional strokes per hole. This advantage  
15 may be offered to the user as a feature on the score card that the golf course provides to the participating user to keep score. If the participating user capitalizes on this offered advantage, the golf course would recognize the total score recorded minus two strokes per hole as the "official" score of the participating user. Alternatively, in the case of partial computing environments, advantages may be integrated using a combination of the aforementioned  
20 techniques.

An exemplary transaction system for use with integrated advantages may include security to protect the integrity of the transaction and the advantage being transacted and communication means to inform participating users of the availability of an advantage and information regarding the price and description of the advantage. Additionally, this system  
25 may track and store participating users' advantages information such as demographic information, buying habits, preferences or tastes. This information is subsequently used to determine the popularity of advantages and to assist in identifying and creating new advantages that can be tailored to participating users' preferences. Further, the exemplary transaction system may include inventory, sales, and tracking information for the various  
30 advantages offered and sold. Optionally, the system may include one or more pricing



mechanisms that set advantages prices based on a variety of factors. These factors include: participating users' preferences, cost, supply and demand. Further pricing may be realized through auctions and reverse auctions or other methods.

5 Transacting Advantages:

There are three steps performed when transacting advantages: 1) transaction request, 2) transaction processing, and 3) transaction fulfillment. During the first step a participating user requests a discrete advantage (e.g. ammunition or additional lives). The request is processed by the aforementioned transaction system to determine if the request can be successfully fulfilled. This determination may involve checking the profile and account balance of the requesting participating user to see if they are qualified for the advantage and ensuring the participating user has requested a valid advantage. If the participating user qualifies, the user's account is debited and the requested advantage is provided. The transaction occurs in a real time two-way transaction. For example, a participating user navigating in a computing game environment requests more ammunition. The user is processed and if qualified, received the ammunition immediately – the accounting for which is settled latter. This permits the participating user to continue in their computing game environment (i.e. continue playing the game) without the usual interruption of transaction processing.

As will be described below with respect to Figures 1-6, the present invention is directed to a system and methods that enable the procurement and transaction of advantages. In accordance with an illustrative implementation thereof, the present invention comprises a system and methods that couples participating users with advantages providers for the transaction of advantages.

25 Illustrative Computing Environment

Figure 1 shows computing system 100 that may support the present invention. Computing system 100 comprises computer 20a that may comprise display device 20a' and interface and processing unit 20a''. Computer 20a may support computing application 180.

As shown, computing application 180 may comprise computing application processing and

storage area 180 and computing application display 180b. Computing application processing and storage area 180a may contain advantages data store 180a'. Similarly, computing application display 180b may comprise display content 180b'. In operation, a user (not shown) may interface with computing application 180 through the use of computer 20a. The user (not shown) may navigate through computing application 180 to obtain various advantages. Advantages may be retrieved by computing application 180 from advantages data store 180a' of computing application processing and storage area 180a and shown to a user (not shown) as display content 180b' on computing application display 180b. The user (not shown) may choose to purchase certain advantages. Transacted advantages may be stored in advantages data store 180a' in user accounts that may be communicated to cooperating advantages content providers (not shown).

#### Illustrative Computer Network Environment

Computer 20a, described above, can be deployed as part of a computer network. In general, the above description for computers applies to both server computers and client computers deployed in a network environment. Figure 1A illustrates an exemplary network environment, with a server in communication with client computers via a network, in which the present invention may be employed. As shown in Figure 1A, a number of servers 10a, 10b, etc., are interconnected via a communications network 160 (which may be a LAN, WAN, intranet, the Internet, or other computer network) with a number of client computers 20a, 20b, 20c, or computing devices, such as, mobile phone 15, land-line telephone 16, and personal digital assistant 17. In a network environment in which the communications network 160 is the Internet, for example, the servers 10 can be Web servers with which the clients 20 communicate via any of a number of known protocols, such as, hypertext transfer protocol (HTTP) or wireless application protocol (WAP). Each client computer 20 can be equipped with browser 180a to gain access to the servers 10. Similarly, personal digital assistant 17 can be equipped with browser 180b and mobile phone 15 can be equipped with browser 180c to display and receive various data.

In operation, a user (not shown) may interact with a computing application running on a client computing devices to obtain a variety of advantages. The advantages may be stored

on server computers and communicated to cooperating users through client computing devices over communications network 160. A user may purchase an advantage by interfacing with computing applications on client computing devices, thereby creating an advantages transaction. These transactions may be communicated by client computing devices to server computers for processing and storage. Server computers may host computing applications for the processing of advantages transactions and advantages data stores for the storage of such transactions.

Thus, the present invention can be utilized in a computer network environment having client computing devices for accessing and interacting with the network and a server computer for interacting with client computers. However, the systems and methods providing the creation, integration, and transaction of advantages and interactive advertisement of the present invention can be implemented with a variety of network-based architectures, and thus should not be limited to the example shown. The present invention will now be described in more detail with reference to a presently illustrative implementation.

#### Advantages Transaction

Figure 1B shows the cooperation of various computing elements when transacting advantages and interactive advertisements in a computing environment. A participating user may employ computing application 180a operating on client computer 20a to send a request for advantages content 110 to content provider's server 10a over communications network 160. In response, content provider's server 10a may process send the request and retrieve environment features and/or elements (i.e. advantages) content and/or interactive advertisements content from environment features and elements database 10b for communication to client computer 20a over communications network 160. Further, participating user may employ computing application 180 to communicate requests to purchase advantages or products and services offered by the interactive advertisements. The advantages may be requested by participating users or alternatively may be offered to participating users based on predefined conditions (e.g. a participating user passes a rendition of cellular phone shop in a computing application game and is prompted on whether he/she would like to purchase a cellular phone or, alternatively, if already owning a cellular phone,

whether he/she would like to pay their bill).

Figures 2, 3, 4, and 4A illustrate screen shots that display various features of the advantages and interactive advertisements system. As shown in Figure 2, the advantages and interactive advertisements system of the present invention may be incorporated in computing application 180 displaying an interactive game through gaming pane 200. Gaming pane 200 may comprise gaming content 205 and advantages dialog box 210. In operation, a user may be prompted by gaming computing application to secure a variety of advantages. In the example shown, dialog box 210 may warn the user that he/she is low in ammunition in the interactive search and destroy game 205 that is being navigated. A user may choose to purchase additional ammunition and proceed, or alternatively, proceed without securing any advantages. Conventionally, this advantage would not be offered to gamers. Rather, gamers would be forced to proceed with low ammunition using skill to advance in the game. Typically, gamers would proceed with low ammunition only to be defeated. The user may be relegated to start the game from the very beginning, rendering all of his/her invested time moot.

Figure 3 shows computing application 180 supporting a Web browser computing application having Internet content display pane 300. Internet content display pane 300 may comprise Internet content 305 and controls 310. In the example shown, the advantages and interactive advertisement system of the present invention may be employed by an airline content provider providing content over the Internet. As part of their Internet content 305, airlines may request users to choose a seat for their travel. In the event a preferred seat has been already reserved, the user may be prompted by the Internet computing application to purchase an advantage to obtain the desired seat. The user may proceed to purchase this advantage by navigating controls 310.

Alternatively, the present invention may offer users interactive advertisements by which users can purchase a variety of products or services. These advertisements may be integrated within a number of computing applications in accordance to the context of the computing application. For example, in a simulation role playing game, real world products and/or services advertisements may be integrated in the game's landscape such that a user may interact with the cyber world advertisements to transact real world products and/or

services. As shown in Figure 4, the present invention may be employed by computing application 180 supporting a cyber environment having display pane 400. Display pane 400 may comprise interactive content 405 and interactive content dialog box 410. In operation, a user may be engrossed in a role playing computing application game for hours not realizing that the dinner hour is soon upon him/her. In the game, the user may be required to navigate through city streets and neighborhoods having storefronts and other real world constructs. As the user passes by a cyber realm storefront, ABC Pizza, dialog box 410 may appear to the user of computing application 180 providing a friendly reminder that dinner time is approaching. The user may proceed to enter the store in the cyber world and place an order for a real world pizza. The system of the present invention would communicate the order to the appropriate parties and the real world product would be delivered to the user. The user is now given the ability to transact real world products through the cyber realm storefront.

Figure 4A shows a screen shot of an exemplary computing simulation application 413 describing the integration and real-time transaction features of the present invention. As shown, screen shot 415 comprises simulation content 420, advantages information 325, and transaction information 430. In operation, a participating user may operate computing simulation application 413 to interact with simulation content 420. Computing simulation application 415 may be configured that is has access to advantages content provider computer server 10a (of Figure 2) such that advantages may be offered through computing application 413 to the participating user while interacting with computing application 413. In the example shown, the game is directed to a "shot-em up" type game where the participating user is called upon to slay unworldly beasts using a variety of weaponry. As the participating user runs low on ammunition (or some other condition), advantages information 425 is displayed to offer advantages to the participating user. As such, the advantage is integrated into computing application 413. Advantages information 425 comprises information about the advantage and the cost of the advantage. In addition to the advantages information 425, transaction information 430 is offered to the participating user to inform him/her of their outstanding balance. The participating user may elect to accept the offered advantage, using advantages information 425 and transaction information 430 to help him/her in their decision, to enhance his/her interaction with computing application 413.

Figure 5 describes the general processing performed by the advantages and interactive advertisements system and methods. Processing begins at block 500 and proceeds to block 505 where a check is performed to determine if the participating user has an account to purchase advantages or transact interactive advertisements. If the user has an account, he/she is prompted to login at block 510. Interactive advertisements are then offered to the user at block 515. From there, a determination of the advantages and/or desired products and services (as requested in the cyber realm) is made at block 520 to ascertain those advantages to offer to the user, or to provide to the user based on their request. The advantages and/or products and services are supplied to the user at block 525. Payment authorization is then made at block 530. Using the present invention, participating users have the ability to "purchase" these environment features and/or elements, products, and services using various currency means, including credit cards, e-cash, e-gold, other Internet enabled currency, and secondary monetary sources, such as, charges to phone or utility bill, transferring credit on pre-paid phone cards, or transit passes, or through conventional payment methods, such as checks, money-orders or cash. A check is then made at block 535 to determine if the participating user has an awards account. The awards account is established for frequent users to provide advantages and/or products and services at a discounted rate. This promotes the use the present system and maintains user loyalty. If the user has an awards account at block 535, the awards account is updated at block 540 and processing ends at block 545. If, however, the user does not have an awards account, he/she is prompted at block 565 to see if the user would like to create an awards account. If the user wants an awards account at block 565, an account is created at block 570 and processing proceeds therefrom.

Alternatively, if at block 505, it is determined that the user does not have an account to transact advantages and/or purchase through interactive advertisements, the user is queried to create an account at block 550. If the user does not want an account processing proceeds to block 545 and ends. However, if the alternative proves to be true, processing proceeds to block 555 where user demographic and payment information is procured. A user profile is then created at block 560 and processing jumps to block 515 and proceeds therefrom. The profile information may be used by the system to tailor advertisement offerings to participating users, such that products and service offerings are consistent with the user's

profile information.

Figure 6 depicts a real-world implementation of the advantages procurement and transaction system and methods of the present invention. Real-world environment advantages procurement and transaction system 600 is shown comprising participating user 605, communications network 160 and advantages provider 610. In an illustrative implementation, the advantages provider 610 may comprise a regulatory agency providing a set of defined advantages. In operation, real-world environment advantages procurement and advantages system 600 may afford participating user 605 the ability to submit advantages request 635 to advantages provider 610 over communications network 160. In turn, advantages provider 610 may satisfy advantages request 625 by providing advantages 620 over communications network 160.

In the example shown, the regulatory agency may offer a speeding advantages program 620 to participating users 605. The speeding advantages program contemplated would offer participating users 605 the ability to drive in excess of posted speed limits upon the payment of fee. The participating user, in effect, would be offered exemptions from speeding tickets if caught speeding within the limits of the offered speeding advantages program. In operation, participating user 605 may request and transact advantages by submitting advantages request 625 to regulatory agency 610 over communications network 160 of real-world advantages procurement and transaction system 600. In turn, regulatory agency 610 may subscribe participating user 605 to the speeding advantages program 620 employing communications network 160 to relay the subscription and payment process.

#### Advertisement Advantages

The present invention also contemplates an alternative embodiment where the participating user is an advertiser. In an illustrative implementation, the advertiser of products and services in computing environments, such as, interactive TV, online movies, streaming media, or video clips, may obtain advantages over their competitors, such as better placement of advertisements in the computing environment for their products and/or services. In doing so, the advantage using advertisers can better target and reach a larger audience. These participating users (i.e. advertisers) are charged for the advertisement advantage much like

other advantages users according to the pricing, charging, and billing techniques described above.

5 Conclusion

In sum, the present invention provides system and methods to create, integrate, and transact advantages. It is understood, however, that the invention is susceptible to various modifications and alternative constructions. There is no intention to limit the invention to the specific constructions described herein. On the contrary, the invention is intended to cover all  
10 modifications, alternative constructions, and equivalents falling within the scope and spirit of the invention.

It should also be noted that the present invention may be implemented in a variety of computer environments (including both non-wireless and wireless computer environments), partial computing environments, and real world environments. The various techniques  
15 described herein may be implemented in hardware or software, or a combination of both. Preferably, the techniques are implemented in computer programs executing on programmable computers that each include a processor, a storage medium readable by the processor (including volatile and non-volatile memory and/or storage elements), at least one input device, and at least one output device. Program code is applied to data entered using the  
20 input device to perform the functions described above and to generate output information. The output information is applied to one or more output devices. Each program is preferably implemented in a high level procedural or object oriented programming language to communicate with a computer system. However, the programs can be implemented in assembly or machine language, if desired. In any case, the language may be a compiled or  
25 interpreted language. Each such computer program is preferably stored on a storage medium or device (e.g., ROM or magnetic disk) that is readable by a general or special purpose programmable computer for configuring and operating the computer when the storage medium or device is read by the computer to perform the procedures described above. The system may also be considered to be implemented as a computer-readable storage medium,  
30 configured with a computer program, where the storage medium so configured causes a

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computer to operate in a specific and predefined manner.

Although an exemplary implementation of the invention has been described in detail above, those skilled in the art will readily appreciate that many additional modifications are possible in the exemplary embodiments without materially departing from the novel

- 5 teachings and advantages of the invention. Accordingly, these and all such modifications are intended to be included within the scope of this invention. The invention may be better defined by the following exemplary claims.

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